UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte CHRISTOPHER W. GABRYS and DENNIS G. SIMMONS

Appeal No. 2006-1890
Application No. 09/630,157
Technology Center 3600

ON BRIEF

Before FRANKFORT, CRAWFORD, and LEVY, Administrative Patent Judges.

LEVY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-8 and 10-20. Claim 9 has been withdrawn from consideration.

We AFFIRM-IN-PART.

BACKGROUND

The appellants' invention relates to a flywheel hub-to-rim coupling (specification, page 1). In particular, the invention includes a coupling that accommodates radial growth of the flywheel rim in operation without decoupling from the hub (specification, page 1).

Claims 1 and 7 are representative of the invention, and are reproduced as follows:

1. A flywheel system, comprising

a flywheel hub having an axis of rotation and a radially slotted exterior surface facing radially outwards;

an annular rim liner having an axis of rotation coinciding with said hub axis of rotation, and having an inner surface facing radially inward, said inner surface having radial projections on said rim liner that mate with said hub slots to form a torque transmitting coupling therebetween that maintains concentricity between said hub and said rim liner while allowing said rim liner to grow radially with respect to said hub; and

an annular flywheel rim on said rim liner having an axis of rotation coinciding with said rim liner axis of rotation, and having a circumferential hoop direction.

7[1]. A hub for a high speed flywheel system, comprising:

a flywheel hub having radial splines;

a flywheel rim liner having radial projections mating with said splines to form a torque transmitting coupling between said hub and said liner that maintains concentricity between said hub and said rim liner;

said flywheel rim liner made of a material having a strain-to-failure capability and a ratio R_1 equal to E_1/p_1, wherein E_1 is a hoop modulus of elasticity of said rim liner and p_1 is the density of said rim liner material;

said rim liner strain-to-failure capability and ratio R_1 being such that said rim liner remains in compressive contact with said rim from start to maximum speed of said flywheel system.

The prior art reference of record relied upon by the examiner in rejecting the appealed claims is:

Kundermann	6,302,800	Oct. 16, 2001 (Filed Aug. 04, 1999)

Claims 1-8 and 10-20 stand rejected under 35 U.S.C. § 112, first paragraph, as lacking enablement.

Claims 7, 8 and 10-20 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 7 and 8 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kundermann.

---

[1] Appellants filed an amendment to claim 7 concurrently with the reply brief. There is no evidence in the record that the examiner has entered, or denied entry, of the amendment. Although it appears to this panel that the amendment overcomes the rejection of claim 7, because there is no evidence that the amendment has been entered, we consider the amendment to not have been entered.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejections, we make reference to the answer (supplemental answer mailed October 11, 2005) and the final rejection (mailed June 7, 2002) for the examiner's complete reasoning in support of the rejections, and to the brief (filed February 24, 2004) and reply brief (filed October 12, 2004) for the appellants' arguments thereagainst.

Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered. See 37 CFR § 41.37(c)(1)(vii)(eff. Sept. 13, 2004).

OPINION

In reaching our decision in this appeal, we have carefully considered the subject matter on appeal, the rejections advanced by the examiner, and the evidence of enablement, indefiniteness and anticipation relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer. Upon consideration of the record before

us, we make the determinations which follow.

We begin with the rejection of claims 1-8 and 10-20 under 35 U.S.C. § 112, first paragraph, as lacking enablement. The first paragraph of 35 U.S.C. § 112 requires, inter alia, that the specification of a patent enable any person skilled in the art to which it pertains to make and use the claimed invention. Although the statute does not say so, enablement requires that the specification teach those in the art to make and use the invention without "undue experimentation." In re Wands, 858 F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). That some experimentation may be required is not fatal; the issue is whether the amount of experimentation required is "undue." In re Vaeck, 947 F.2d 488, 495, 20 USPQ2d 1438, 1444 (Fed. Cir. 1991) (emphasis in original).

The Federal Circuit has set out a number of factors that are relevant to whether undue experimentation would be required to practice a claimed invention. They include "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." In re Wands, 858 F.2d at 737, 8 USPQ2d

at 1404 (Fed. Cir. 1988).

The examiner's position (final rejection, page 2) is that

> Claims throughout recite the limitation wherein the rim liner grows radially with the rim. This growth is attributed by the specific characteristics of each material the rim and the rim liner utilize. Although the formulas for calculating the numerical values to compare each other are provided, the variables dealing with the characteristics of each material used are not provided in the specification. Without the exact composition of the material and its values such as modulus of elasticity or the density, making of the invention is very difficult to carry out. For instance, there are many different compositions of E-glass or carbon fiber/epoxy that can be produced. In order to make the best mode contemplated by the inventor of carrying out his invention, the specification must be described fully what those compositions are.

The examiner adds (final rejection, pages 2 and 3) that the strain-to-failure capability of greater than 4%, as recited in claim 14, is not enabled because the specification does not support how the percentage is produced.

Appellants assert (reply brief, page 6) that

> In the normal process of flywheel design, the engineer would design his flywheel rim to achieve the desired qualities of energy storage capacity, speed, size, temperature limitations, process requirements, cost, etc. that are the typical considerations in designing a flywheel system. In that design process, the flywheel rim-to-hub coupling is not a consideration. It is only after the flywheel rim design has been finished that the engineer would turn to the design of the hub-to-rim coupling. At that point, he knows exactly what the centrifugal growth of the rim will be because he knows exactly what materials he used in the rim, and the growth characteristics can be calculated using data from the material supplier and known analysis techniques based on the characteristics of the materials used in the rim.

It is further asserted (reply brief, page 7) that with respect to claim 14

> Of course, it [strain-to-failure] is always set forth in terms of percentage, since parts of different size would obviously have different absolute deformation elongations before failing, simply because there are different amounts of material in parts of different sizes.

We note at the outset that the examiner states (answer, page 2)that the Affidavit has not been entered. Accordingly, the Affidavit has not been considered. From our review of the specification, we find (page 3) that

> The invention includes the use of a flywheel rim liner made of a material having a ratio R_1 equal to E/ρ, where E is the modulus of elasticity in the hoop direction, and ρ is the material density. The ratio R_1 of the rim liner material is less than or equal to the corresponding ratio R_r, of the rim material, so the flywheel rim liner grows radially with the rim.

See also page 7, lines 1-8. From the disclosure of the equations used to ensure that the rim liner grows radially with the rim, we find that an artisan would have been able to determine, based upon the parameters such as speed, size, cost, etc., the composition of the flywheel liner such that the liner grows with the rim. We are not persuaded by the examiner's assertion (final rejection, page 2) that the formulas are not enough and that the exact compositions and its values are necessary for the invention

to be carried out without it being very difficult to carry out the invention. From our review of the record, we agree with appellants (reply brief, page 5), that it does not matter to the invention which composition of E-glass/carbon fiber/epoxy would be used because the invention contemplates use of any materials that would produce an adequate flywheel rim and because a flywheel rim designer already has the knowledge to design a flywheel rim. Although the examiner states that it would be very difficult to carry out the invention without the exact composition of the material and its values, we find no convincing reasoning as to why an artisan in the field of flywheel design would not be able to make and use the invention without undue experimentation. Accordingly, we do not agree with the examiner (answer, page 4) that the disclosure of E-glass and carbon fiber/epoxy, would have an artisan guessing as to what is meant by such materials and would create an undue burden on an artisan as to exactly which composition of E-glass/carbon fiber/epoxy would be sufficient to satisfy the claimed formula.

As to claim 14, we agree with appellants' (reply brief, pages 6 and 7) that the concept of strain-to failure is a rudimentary concept that is well understood by an artisan and that the strain-to-failure capacity of the rim liner is the amount of strain that a part can undergo before it fails. In

addition, we observe that the language of claim 14 appeared in the originally filed claims, which is part of the originally filed specification. From all of the above, we find that the examiner has failed to establish a prima facie case of lack of enablement of claims 1-8 and 10-20. Accordingly, we cannot sustain the rejection of these claims under 35 U.S.C. § 112, first paragraph.

We turn next to the rejection of claims 7, 8 and 10-20 under 35 U.S.C. § 112, second paragraph as being indefinite. The examiner takes the position (final rejection, page 3) that there is insufficient antecedent basis in the claim for the recitation "said rim." The examiner additionally asserts that the phrases "maximum speed" of claim 7 and "high speed" of claims 10, 13, 15 and 18 are relative terms which render the claim indefinite because it is unclear as to what speed of the flywheel is considered to be "maximum speed" or "high speed."

From our review of the disclosure, we agree with the examiner that there is no antecedent basis for the phrase "said rim" of claim 7, and note that appellants do not contest the fact that the claim lacks antecedent basis for the rim. Accordingly, we sustain the rejection of claim 7, and claim 8, which depends therefrom. However, although the phrases "maximum speed" and "high speed" are relative phrases, we find that an artisan, for a

particular rim liner strain-to-failure capability, calculated based on size, cost, etc., would be aware as to what the high speed or the maximum speed of the flywheel system would be. Accordingly, we find that the metes and bounds of claims 10, 13, 15 and 18 would have been understood by an artisan. Accordingly, we cannot sustain the rejection of claims 10-20 under 35 U.S.C. § 112, second paragraph.

We turn next to the rejection of claims 7 and 8 under 35 U.S.C. § 102(e) as being anticipated by Kundermann. The examiner's position (final rejection, pages 4 and 5) is that as shown in figure 13 of Kundermann, element 33 is the flywheel hub, 23 of Kundermann is the rim liner, and that 3 of Kundermann meets the claimed rim. Appellants assert (brief, page 6) that Kundermann does not mention the problem of differential radial growth because it is not a problem that would occur in an automobile because of the low rotational speed of automobile engines and (brief, page 7) that flywheel mass 31 of Kundermann equates to the claimed flywheel rim. Appellants further assert (id.) that no rim liner exists in Kundermann.

We begin our analysis with claim construction. Before addressing the examiner's rejections based upon prior art, it is an essential prerequisite that the claimed subject matter be fully understood. Analysis of whether a claim is patentable over

the prior art begins with a determination of the scope of the claim. The properly interpreted claim must then be compared with the prior art. Claim interpretation must begin with the language of the claim itself. See Smithkline Diagnostics, Inc. v. Helena Laboratories Corp., 859 F.2d 878, 882, 8 USPQ2d 1468, 1472 (Fed. Cir. 1988). Accordingly, we direct our attention to appellants' claim 7 to derive an understanding of the scope and content thereof. What we are dealing with in this case is the construction of the limitations recited in the appealed claims. As stated by the court in In re Hiniker Co., 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998) "[t]he name of the game is the claim." Claims will be given their broadest reasonable interpretation consistent with the specification, and limitations appearing in the specification are not to be read into the claims. In re Etter, 756 F.2d 852, 858, 225 USPQ 1, 5 (Fed. Cir. 1985).

We find that the claim language

> said flywheel rim liner made of a material having a strain-to-failure capability and a ratio R_1 equal to E_1/ρ_1, wherein E_1 is a hoop modulus of elasticity of said rim liner and ρ_1 is the density of said rim liner material;
>
> said rim liner strain-to-failure capability and ratio R_1 being such that said rim liner remains in compressive contact with said rim from start to maximum speed of said flywheel system

does not recite that the ratio R_1 for the flywheel rim liner is

lower that the corresponding ratio for the rim materials, as recited in appellants' specification (page 7). Nor does the language of the claim

> said rim liner strain-to-failure capability and ratio R_1 being such that said rim liner remains in compressive contact with said rim from start to maximum speed of said flywheel system

requires that the rim liner grows with the rim, as correctly pointed out by the examiner (answer, pages 5 and 6). We decline to read limitations into the claim that are not found therein. However, from the above language we find that the claim requires that the strain-to-failure capability and ratio R_1 being such that the rim liner remains in compressive contact with the rim from start to maximum speed of the flywheel system.

Turning to Kundermann, we find that element 3 represents the free end of the crankshaft of an internal combustion engine col. 8, lines 8 and 9). Driver 23 is comprised of radial flange 13, elastic flange 15, together with axial attachment 17 (col. 8, lines 22-24). Element 31 is a flywheel mass, which has a primary flange 33. Primary flange 33 is part of a housing 35 of a torque converter, but is likewise conceivable as a flywheel mass on the drive side of a two mass flywheel. Crankshaft 3 has an axial hole at its center of rotation to accommodate bearing journal 41 which is attached to the primary flange 33 on the inside (col. 8, lines 28-39). In the embodiment of figure 13, holder 25 is

designed as axially elastic flange 106 and has an elastic spring turn 108 (col. 11, lines 43-48).

From our review of Kundermann we find that element 3 is the free end of the crankshaft of an internal combustion engine of an automobile and is not a flywheel rim. In addition, we find that flywheel mass 31 can either be part of the housing for a torque converter or part of a two mass flywheel. Accordingly, we agree with appellants (brief, page 7) that flywheel mass 31 corresponds to the claimed flywheel rim, and not to the flywheel hub as advanced by the examiner. From the disclosure of Kundermann that flange 15 is elastic, we agree with the examiner that the driver 23 will have a strain-to-failure ratio. However, because crankshaft 3 cannot reasonably be considered to be a flywheel rim, and flywheel mass 31 cannot reasonably be considered to be the claimed flywheel hub, we find that driver 23 cannot reasonably be considered to be a rim liner as set forth in claim 7. Even if, assuming arguendo, we agreed with the examiner that crankshaft 3 met the claimed rim and that driver 23 met the claimed rim liner, and that flywheel mass 31 met the claimed flywheel hub, the claim would still not be anticipated because Kundermann does not disclose that the rim liner strain-to-failure capability and ratio R_1 are such that the rim liner remains in compressive contact with the rim from start to maximum speed.

Rather, we agree with appellants' (brief, page 9) that because the driver 23 is secured to the crankshaft 3 through screws 9 the driver 23 is not kept in compressive contact with the crankshaft 3 due to the characteristics of the driver.

From all of the above, we find that the examiner has failed to establish a prima facie case of anticipation of claim 7, and claim 8 which depends therefrom. Accordingly, we cannot sustain the rejection of claims 7 and 8 under 35 U.S.C. § 102(e).

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-8 and 10-20 under 35 U.S.C. § 112, first paragraph is reversed. The decision of the examiner to reject claims 7 and 8 under 35 U.S.C. § 112, second paragraph is affirmed. The decision of the examiner to reject claims 10-20 under 35 U.S.C. § 112, second paragraph is reversed. The decision of the examiner to reject claims 7 and 8 under 35 U.S.C. § 102(e) is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

CHARLES E. FRANKFORT)
Administrative Patent Judge)
)
)
)
) BOARD OF PATENT
MURRIEL E. CRAWFORD) APPEALS
Administrative Patent Judge) AND
) INTERFERENCES
)
)
STUART S. LEVY)
Administrative Patent Judge)

SSL/vsh

J. MICHAEL NEARY
53939 PINE GROVE ROAD
LAPINE, OR 97739